

## ABSTRACT

Optical transmission apparatus 100 is provided with laser element 101 and optical fiber 102 and has an optimum position where the efficiency of optical coupling  
5 between laser element 101 and optical fiber 102 becomes a maximum. Laser element 101 and optical fiber 102 are fixed at positions shifted from the optimum position in the direction of the optical axis by a value within a range from 10 $\mu$ m to 150 $\mu$ m. It is possible to construct  
10 the apparatus such that outgoing light of laser element 101 is not parallel to the optical axis of outgoing light from an end face of optical fiber 102 and the outgoing light of laser element 101 is not parallel to the optical axis of light reflected on the end face of optical fiber  
15 102.

FIG. 4

SHIFT OF OPTICAL AXIS (Z-AXIS DIRECTION)

Y AXIS

Z AXIS

5 X AXIS

OPTIMUM POSITION

FIG. 5

RIN IS DOMINANT

10 THERMAL NOISE IS DOMINANT

SIGNAL TO NOISE RATIO CNR [dB]

B SPECIFIED VALUE

AMOUNT OF SHIFT IN OPTICAL AXIS DIRECTION Z ( $\mu\text{m}$ )

15 FIG. 6

Y AXIS

Z AXIS

X AXIS

20 FIG. 8

DOWNLINK

UPLINK

FIG. 9

25 DOWNLINK

UPLINK